

# Expanding the GES DISC Sounder Data Usability in Application Communities

Feng Ding<sup>1,3</sup>, Jennifer Wei<sup>1,3</sup>, Thomas J. Hearty<sup>2,3</sup>, Michael Theobald<sup>1,3</sup>,  
Bruce Vollmer<sup>3</sup>, Andrey Savtchenko<sup>1,3</sup>, Asghar E. Esfandiari<sup>1,3</sup>

1. ADNET Systems Inc.
2. Wyle Information Systems Inc.
3. NASA/GSFC Goddard Earth Science Data and Information Services Center, Code 610.2, Greenbelt, MD 20771

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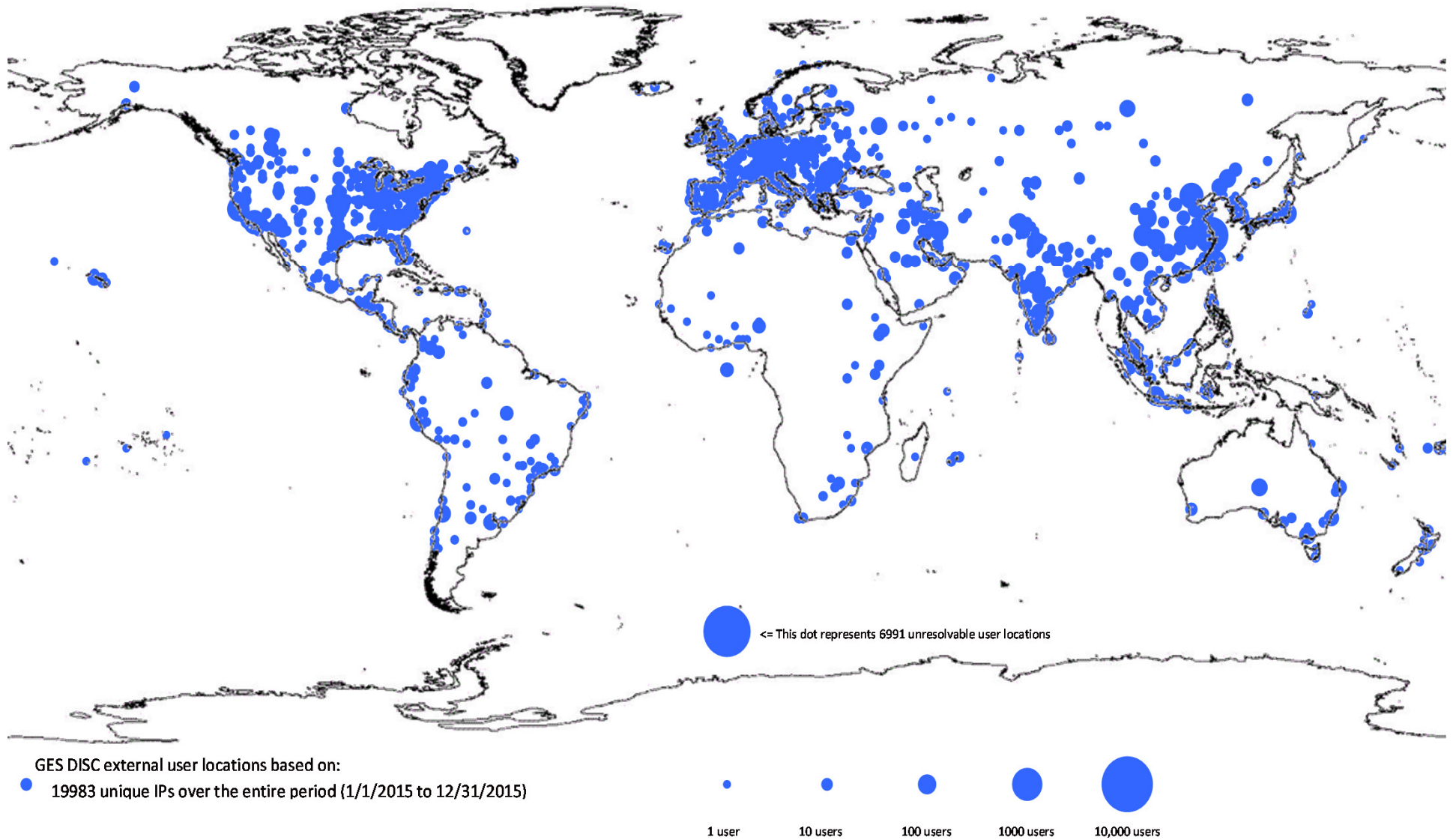
# Outline

- Sounder data support at GES DISC
- Users and applications of AIRS data assisted by GES DISC support team
- AIRS data usage trend
- GES DISC update
  - i. Giovanni-4 new features
  - ii. Unified User Interface (UUI)
  - iii. AIRS imagery in Global Imagery Browse Service (GIBS) via Big Earth Data Initiative (BEDI)
  - iv. User Registration System enforcement

# Sounder Data Support

- Maintain active **archive** of datasets and enhance information services by developing tools and services for users
- Engage the **user community** in their data access, data usability and information/services needs.
- **Applications support:** Giovanni, Mirador/**UUI**, SSW, Data Cookbook/Recipe, OPeNDAP etc.
- Develop, test, and support **tools** for working with GES DISC data, recipes, and use cases.
- Dataset **documentation** support (User Guides, Readme, DIF, etc.)
- **Web content** support, news articles, version release information, and data services updates, FAQ.
- Conference & Science Team participation, **outreach**.
- **Help Desk**/User Support.
- Support for **legacy** missions & document preservation
- Support AIRS and MLS **Near-Real Time (NRT)** product in Land, Atmosphere NRT Capability for EOS (LANCE) program

# Users Over the World Access AIRS Data in 2015



# Users Request Assistance

- About 300 AIRS user assistance records since 2007.
- Identified users over all continents
  1. USA, Canada
  2. UK, Greece, France, Switzerland, German, Sweden, Russia
  3. India, Malaysia, Japan, China, Iraq, Indonesia, Israel, Korea, Pakistan
  4. Argentina, Brazil
  5. Nigeria
  6. Australia
- Government, Academia, Non-profit Organization, Private Sector, Individual.

# Common Requests from Users

- Find/Access/Download Data  
Enhance tools/services for better data search, data access, data download
- Data Subsetting  
Improve ability and performance of data subsetting tool
- Data Reading  
Keep data reader code updated, more data reading recipe
- Documentation and Science Question  
Parameter unit, vertical layers ...  
Can we use AIRS data for .....? Is AIRS data better than ...?  
Enhance metadata and online resources
- Users help us  
Users find error in our website and code not working -> we make correction.

# Examples of Application User Requests

- I am trying to add AIRS NRT layers to our application via WMS service.
- I am interested in AIRS level 2 data (for the ozone vertical profile) over the Indian region only. I want to compare ozonesonde observations with AIRS ozone profiles over Ahmedabad (Lat 23.03, Long 72.5). For that, I need collocated measurements of ozonesonde and AIRS. (August 7, 2013)
- I have been plotting correlation maps (example below) between AIRS Column Amount Ozone and Air Temperature at Surface (daytime, ascending) for the East Asia area, and detected movements
- I am a Physics professor. I do research in remote sensing field. I need AIRS satellite total Column Water Vapor daily data from beginning to the end of the measurements for all over the world
- I am working on climate reanalysis, how I could re-sample the AIRX3STD (level 3) products (temperature, relative humidity and geopotential height all within vertical profiles of the atmosphere). I am interested in the domain( lat 0 to -40 and lon 6-53 but masking area lat (-3 to -37 and lon 10 to 50). That is I am interested in 3 by 3 deg boundaries of the domain (lat 0 to -40 and lon 6-53)

# AIRS and MLS NRT Data Users

- Registered users
- Maintain a user email list
- 525 users in the list as of Feb. 2016



# Two Selected Use Cases

- ?????? Productions

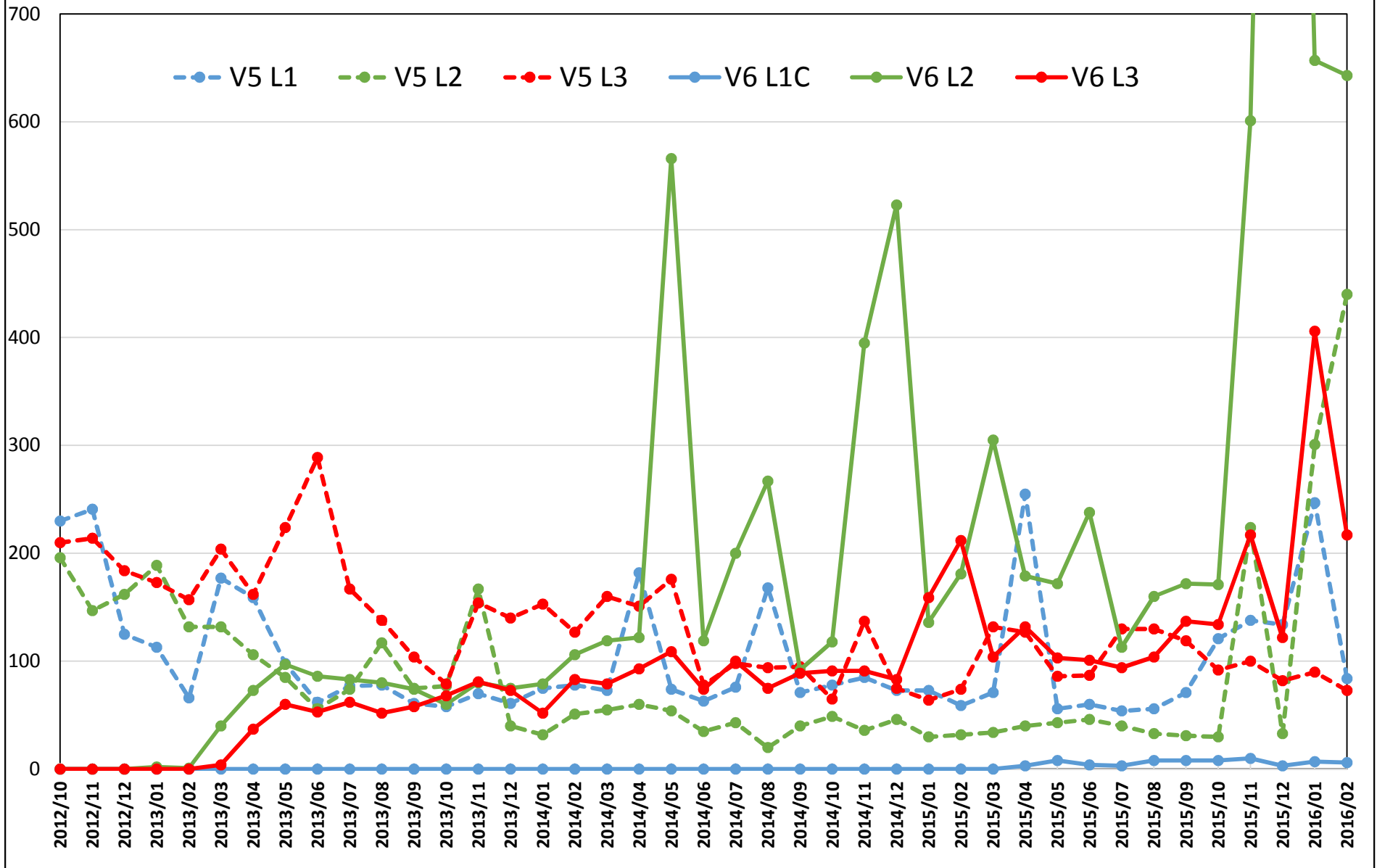
A television production company specializing in factual programs. We are currently making a feature length documentary for NOVA (PBS) called Earth From Space. The film takes the latest satellite data and working models of global processes to tell the story of how the Earth works. We would like to get access to a time series of data related to water vapor (H2OMMRStd) covering the whole globe, in a lat/long projection for the year 2008. Ideally, we would like to get all different profiles of the water vapor (each altitude level) at daily time points.

- ??? Associates Corporation: needs level 2 data

??? provides unique expertise in the areas of wave-optics modeling, adaptive optics systems, and scientific data acquisition, analysis, and management.

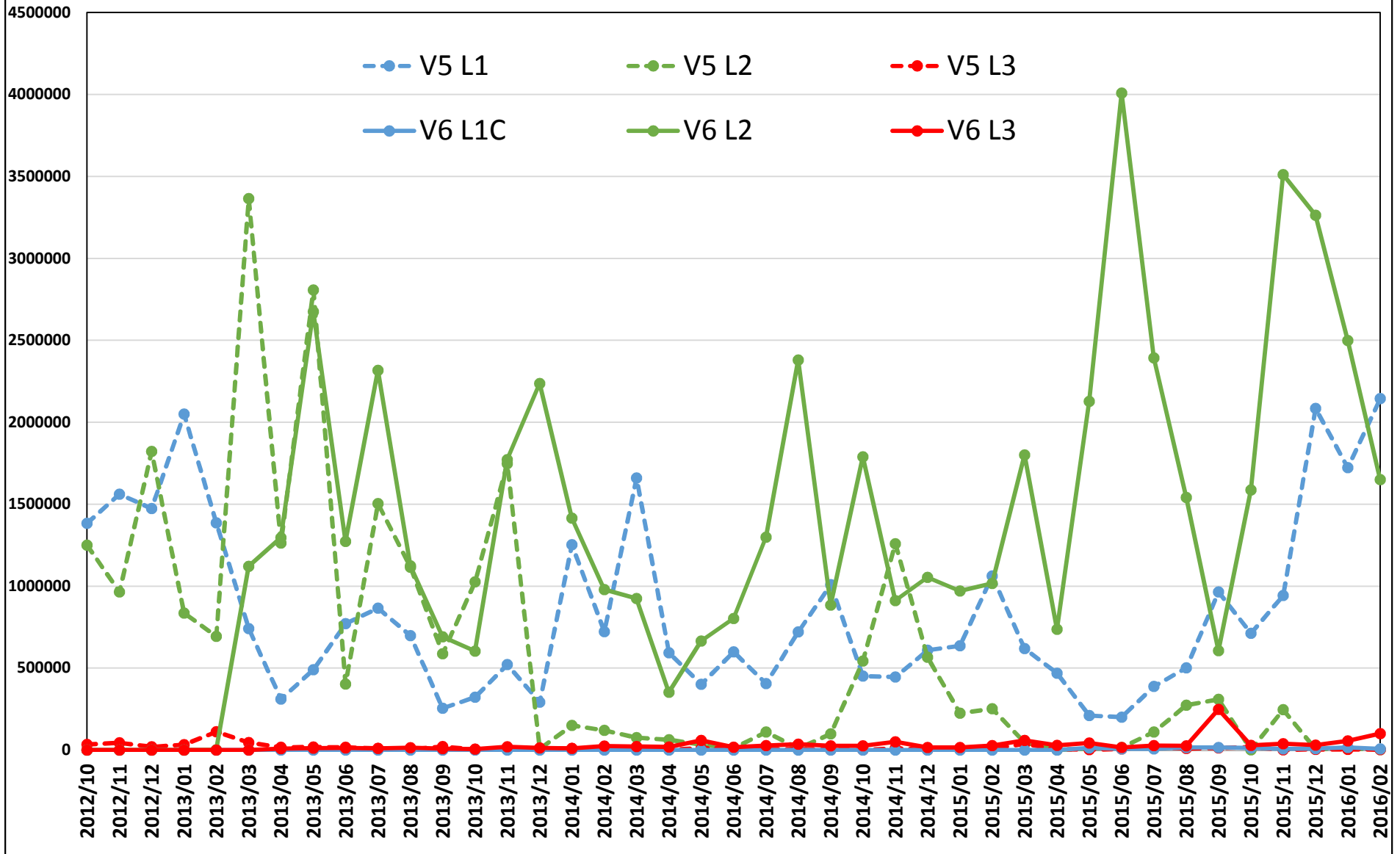
# AIRS Data Users Trend

Number of Users

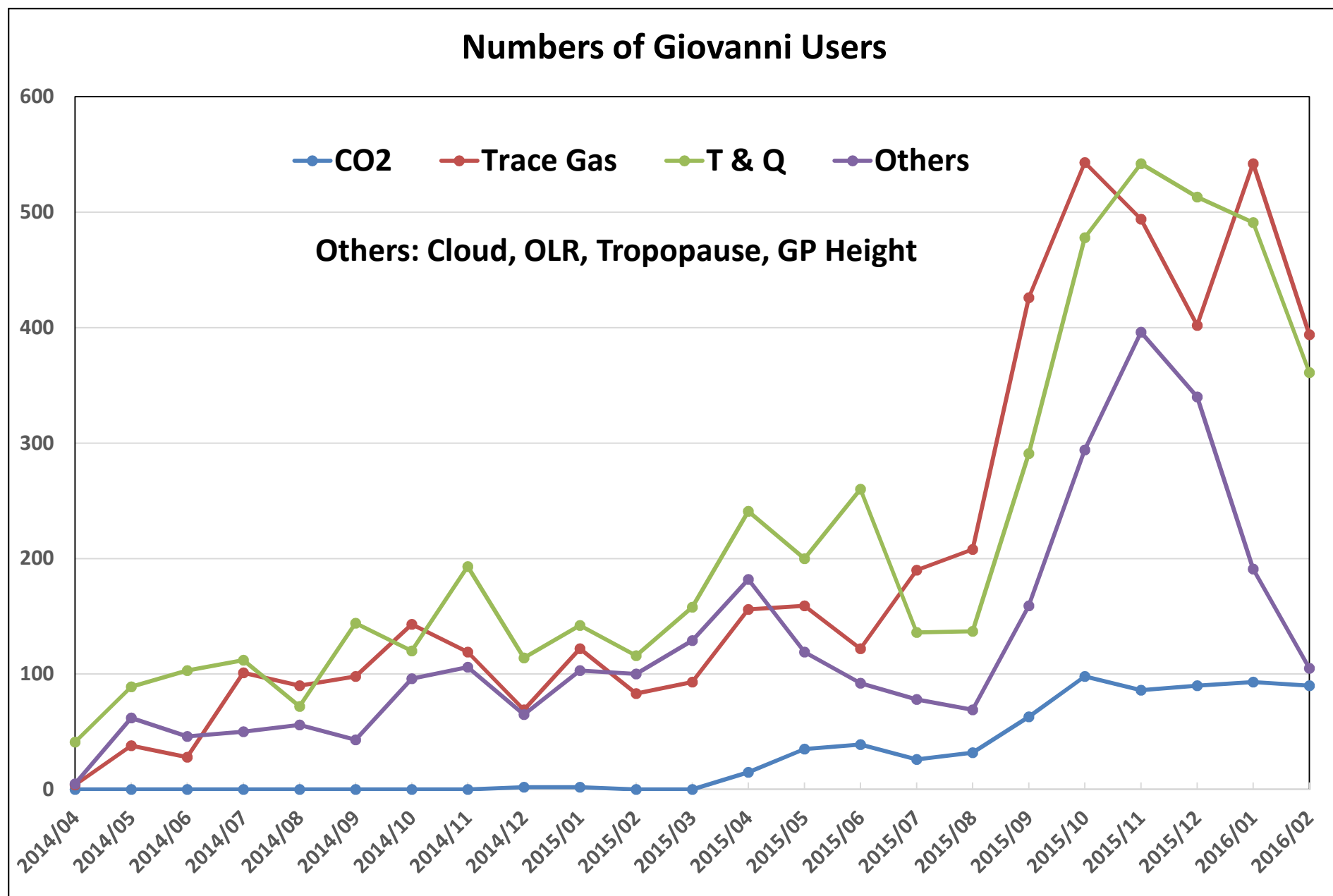


# AIRS Data File Download Trend

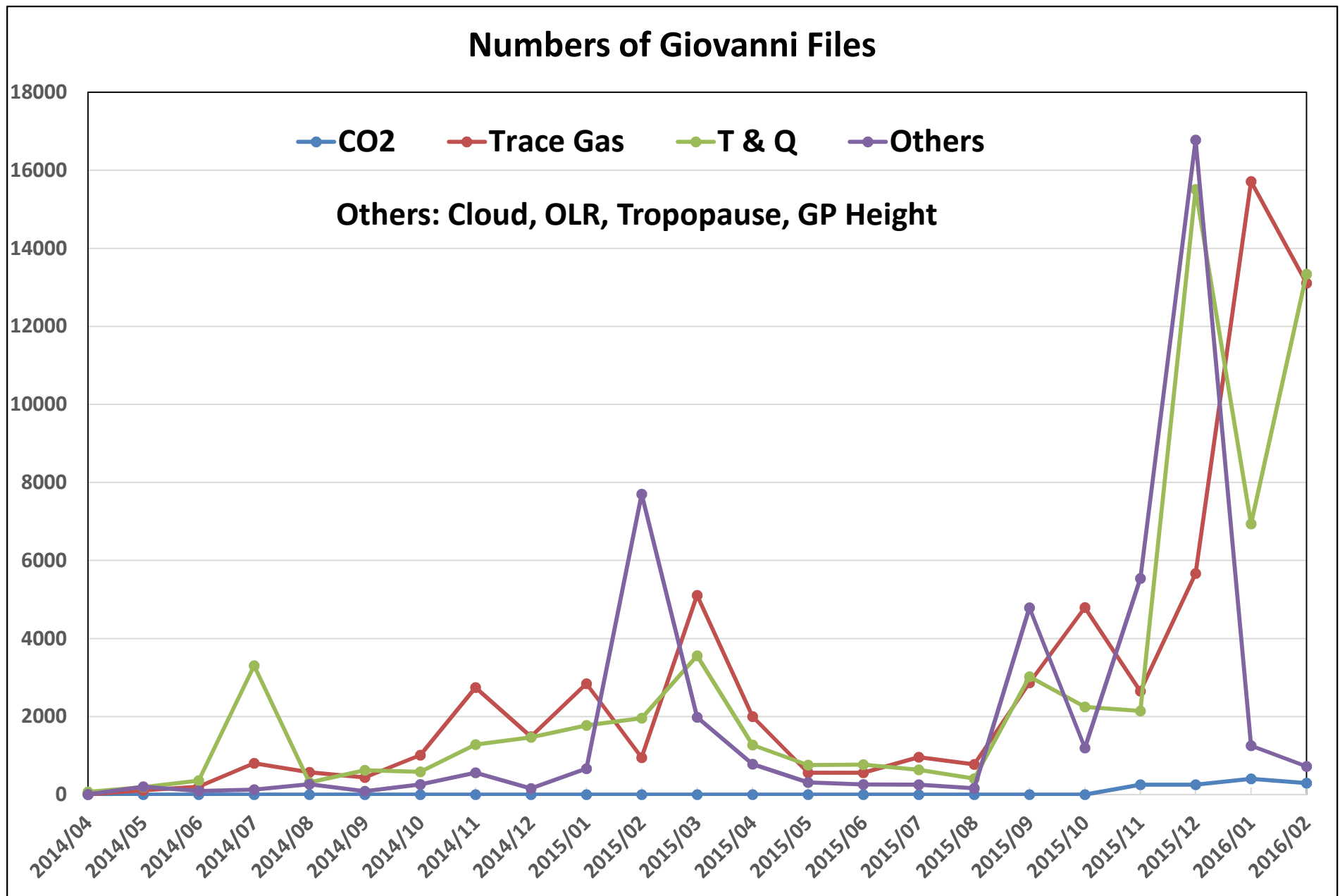
Number of Files



# Giovanni-4 AIRS Users Trend



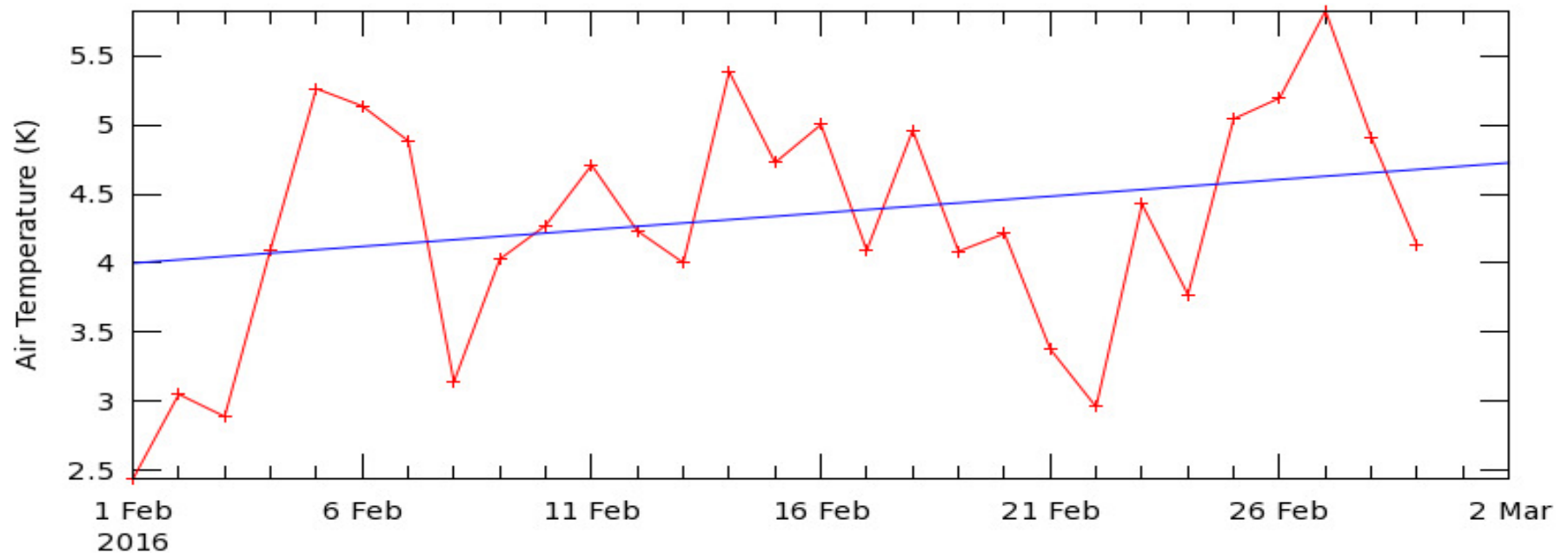
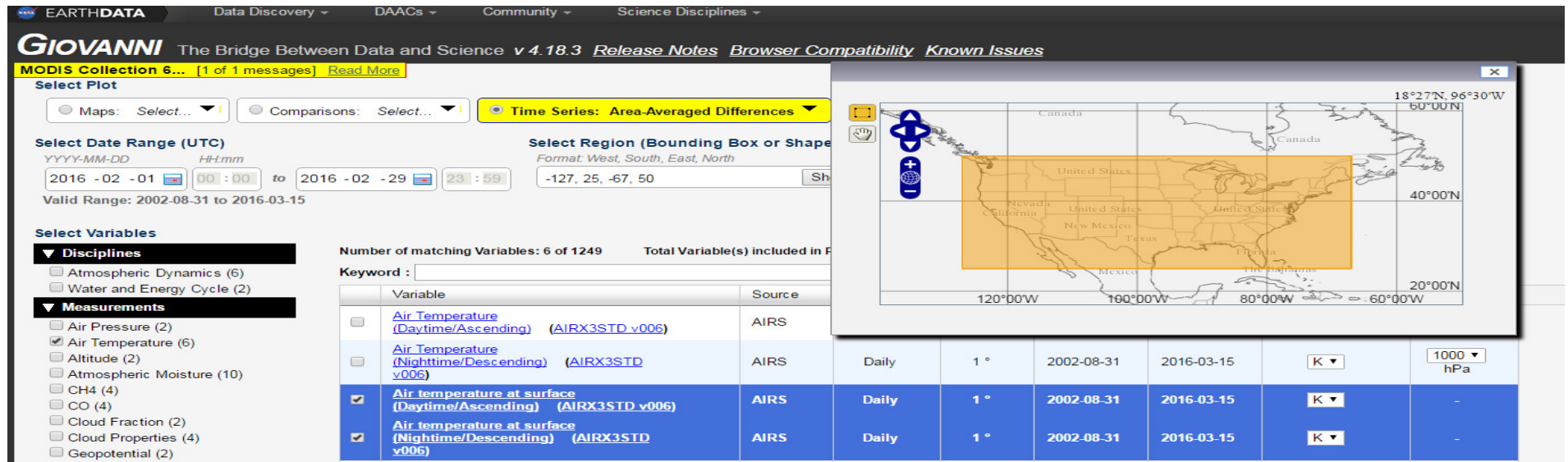
# Giovanni-4 AIRS Data Files Trend



## How New Giovanni-4 Features May Help Application Users?

- Option to show fitted line in time series plot
- Better animation download service
- Option to use log scale color bar

# Fitted Line in Daytime - Nighttime Surface Air Temperature Difference Time Series Plot in Feb. 2016 over US



# Fitted Line Option in Time Series Plot

The screenshot shows the Giovanni web interface in a browser. The address bar displays the URL: `giovanni.gsfc.nasa.gov/giovanni/#service=DiArAvTs&starttime=2016-02-01T00:00:00Z&endtime=2016-02-29T`. The page header includes the NASA EarthData logo and navigation links: Data Discovery, DAACs, Community, and Science Disciplines. The main title is "GIOVANNI The Bridge Between Data and Science v 4.18.1", with links for Release Notes, Browser Compatibility, and Known Issues.

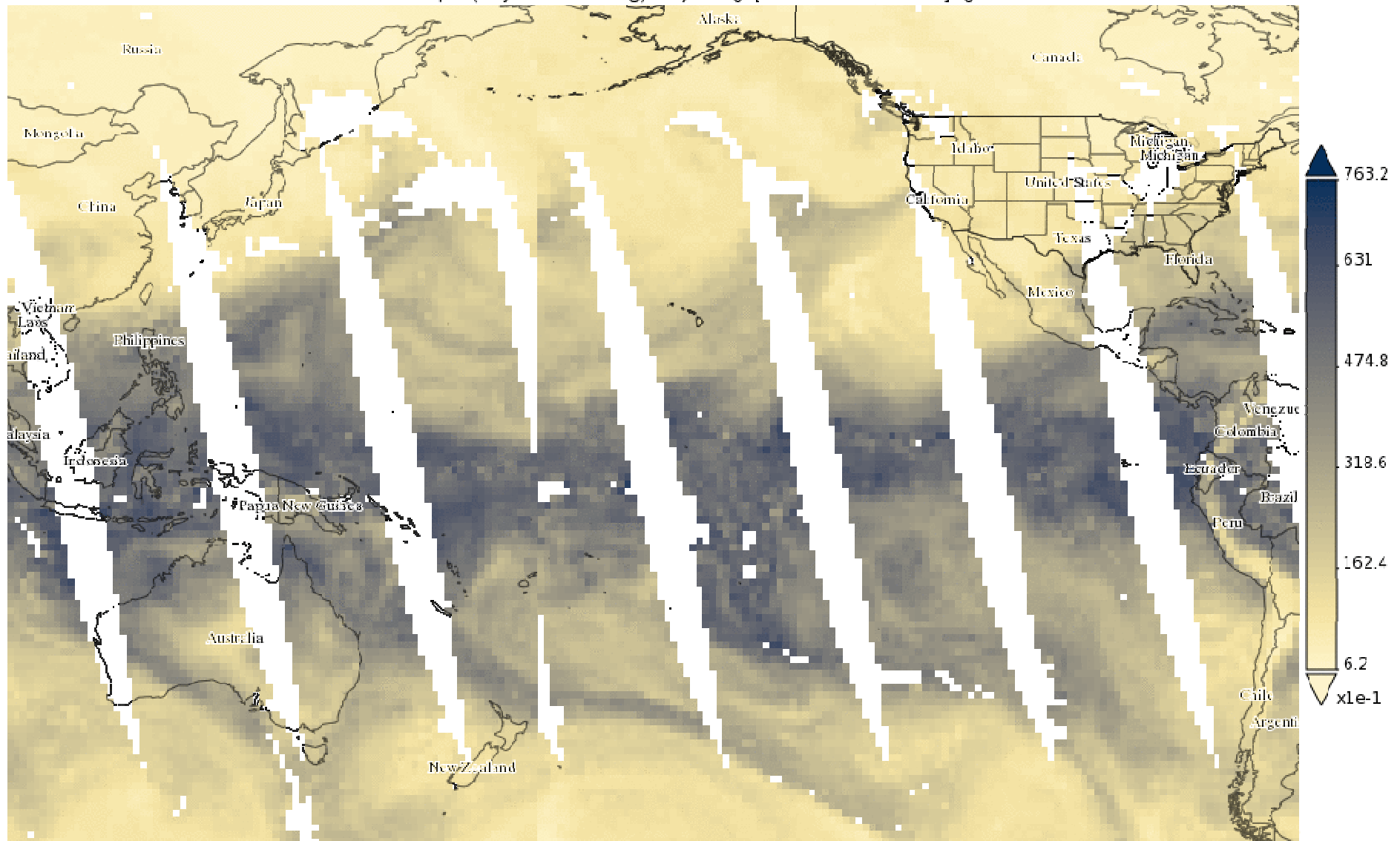
The main content area is titled "1. Time Series, Area-Averaged Differences". Below this, it specifies the data: "Area-Averaged Differences over 2016-02-01 - 2016-02-29, Region 127W, 25N, 67W, 50N of Air temperature at surface:". There are input fields for "Minimum: 2.4379" and "Maximum: 5.82395". A checkbox labeled "Show fitted line:" is checked. At the bottom of the configuration area are two buttons: "Re-Plot" and "Restore Defaults".

On the right side, there is a "History" panel. It contains a list of items, with the first item being "1. Time Series, Area-Averaged Differences". This item has several sub-links: "User Input", "Plots", "Plot Options", "Downloads", and "Linear". A tooltip is visible over the "Linear" link, displaying the text "Click to edit options".



# AIRS Total Water Vapor Animation (03/01 – 03/12/2016): Atmospheric River

Total Column Water Vapor (Daytime/Ascending) daily 1 deg. [AIRS AIRX3STD v006] kg/m<sup>2</sup> 2016-03-01T00:00:00



- Selected date range was 2016-03-01 - 2016-03-12. Title reflects the date range of the granules that went into making this result.

# Unified User Interface (UUI)

- AIRS data holding links to new UUI page rather than old product table page.
- Dynamically updating based on metadata
- Unified one-stop interactive services interface:
  - search: keyword, filter
  - subsetting: facilitate SSW UI
  - downloading: facilitate mirador UI

# AIRS Imagery & GIBS Discussion

- LANCE (NRT) – 2012/05 -> Present
  - No major modifications to current operations
  - Willing to revisit data ranges, color maps and variables.
- Non-LANCE (NRT) – 2013/07 -> Present
  - Unknown whether Level 3 products will include this
- Level 2 Forward/Historical Processing
  - Imagery generated by JPL AIRS Team
  - Potential product list is unknown
  - Delivery mechanism - tentatively SIPS?
  - GES DISC / CMR metadata coordination TBD
- Level 3 Forward/Historical Processing (via BEDI)
  - Imagery generated by GES DISC
  - Potential product list is unknown
  - Delivery mechanism – WMS w/ CMR notifications
- Level 2 vs. Level 3 Duplicate Parameters
  - Can one product serve as the proxy for the other, globally?
  - Colormaps should be the same for the same parameter

# User Registration System (URS) Enforcement

- NRT data access already requires registration through URS
- Upgrade URS-3 to URS-4
- All GES DISC data access requires user registration

Phase I (May 2016)

direct access of all GES DISC data

Phase II (TBD)

applications built upon direct access of GES DISC data